

1 **ABSTRACT**

2 Wood cellulose is treated with a reactive silicate. The reaction is done to cellulose within
3 the wood and may be catalyzed with acid or base catalysts or a carbon silicon halogen combination
4 which produces in situ acid catalysts or a different combination to produce an in situ base catalyst
5 which replaces some of the molecules or atoms within the cellulose structure with silicon, boron
6 or other hydrophobic or anti-degrading agents. Preferably an organic solvent, such as alcohol is
7 used to accelerate the reaction with the water in the wood. Here, the hydroxyl (OH) group on
8 some or all of the cellulose molecules is partially replaced with silicon or an alternative atom or
9 molecule to changes the character of the wood. The process may be modified to insert a
10 preliminary step of adding a reactive agent to be locked into the wood. Manufacturing techniques
11 to enhance the process using ultrasound or other wave generating techniques are also taught.